

When the ventilating fan is started, the relay causes the damper operator to open the outside air damper.

Recirculating dampers and vent dampers may also be opened and closed by means of damper operators controlled from remote locations. Generally these damper operators are positive acting and are either completely opened or closed. However, in some cases where part outside air and part recirculated air is used, it is advantageous to use damper operators which have a certain number of definite positions. With this type of operator it would be possible to use 75 per cent outside air and 25 per cent recirculated air, or any other proportions which might be predetermined. These damper operators are controlled from switches generally mechanically interlocked so that the total opening of the two dampers is 100 per cent.

Hand-Fired Coal Systems

In small buildings the heating plant may be controlled by a single thermostat located in a key room in the building, instead of each room having its own control.

The most common control for a hand-fired furnace or boiler consists of a room thermostat and a furnace regulator of some type. The thermostat should be located in a representative room; never, of course, near the chimney or heat flue, too close to a radiator, or in a drafty hallway, and preferably on an inside wall. The regulator is attached to the draft and check dampers of the furnace. When the temperature of the air surrounding the thermostat drops, the thermostat causes the furnace regulator to open the draft and close the check damper. As soon as the room comes up to temperature, the draft is closed and the check damper opened. With this arrangement on hot water heating systems it is advisable to install an immersion thermostat in the boiler. This thermostat should be connected with the room thermostat so that both must call for heat before the draft is opened, but either one may cause the draft to be closed. On warm air systems it is advisable to use a bonnet thermostat and on steam heating systems a pressure limiting device, in series in each case with the room thermostat. If the temperature of the heating medium becomes too high, the drafts will be closed even though the room thermostat continues to call for heat.

There have been some recent improvements in controls of this type, involving the use of special types of thermostats and auxiliary apparatus which will give closer control and prevent overheating in mild weather.

CONTROL OF AUTOMATIC FUEL APPLIANCES

It is essential that automatic temperature control be used with oil burners, gas burners, and stokers to aid economical operation. There are many types of burners and many types of control, but there are some points common to all. First, a room thermostat is located in a key position in the building to maintain a given temperature at that point. Safety devices are installed in connection with this thermostat so that a failure of the ignition, power, or fuel supply will shut the system down. The same limit controls as recommended for coal burning should be used.

Oil Burners

Fig. 9 illustrates diagrammatically the essentials of an oil burner control circuit. Three thermostats are employed as shown in the illustration. Thermostat No. 1 will stop the burner when the room temperature is too high and No. 2 will stop the burner when the temperature of the heating medium exceeds the setting of thermostat No. 2. Both temperatures must be below their respective thermostat settings to start the burner. Thermostat No. 3 responds to the flame temperatures and in conjunction with the control switch acts as a safety to stop the burner if the latter fails to ignite or burn properly as demanded by thermostats Nos. 1 and 2.

Domestic Applications

Steam and hot water heating plants are often used to provide heat for the domestic hot water supply as well as for heating the building. Fig. 10

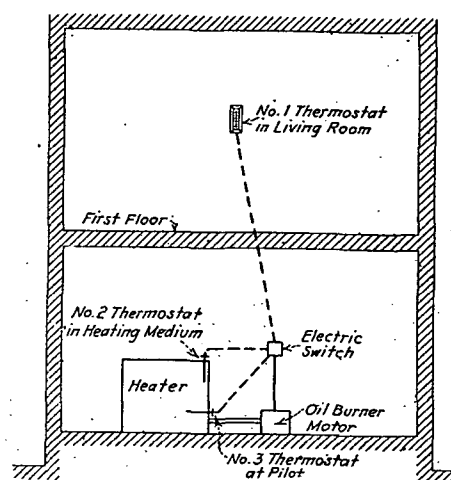


FIG. 9. ELECTRIC THERMOSTAT APPLIED TO OIL-FIRED HEATING SYSTEM

illustrates one such system. The burner control is similar to that shown in Fig. 9 except that either the room thermostat or the tank thermostat may start the burner. If the house is warm enough, the house temperature control valve will remain closed, and the boiler, through the coil heater, will warm the water in the storage tank until the tank thermostat is satisfied when the latter will close its valve and stop the burner. If the house is not warm enough when the tank thermostat is satisfied, the latter will merely close its control valve and the burner will continue to run. The burner will stop only when both thermostats are satisfied, or when the steam pressure shall have reached that allowed by the pressurestat. Much the same control is applied to gas burners and automatic coal stokers.

Gas Heating Appliances

On account of the ease and effectiveness with which the fuel can be controlled, gas-burning appliances are particularly adaptable to full